ing amplitude because of the suspended weights, so that the advancing wave train leaves behind it an ever-lengthening tail, of which the amplitude diminishes backwards. The extreme head of the wave train travels at what is called the *wave velocity* and the middle of the spreading train travels at what is called the *group velocity*. Strictly, the term *wave velocity* applies to the ratio wave-length divided by periodic time in the middle region of a train of waves so long that the diminishing amplitudes in head and tail are without influence.

It is a curious fact, as has been pointed out by Heaviside, that a periodic wave train in a dispersing medium is about the only kind of wave that can be put into simple mathematics, while a mere wave pulse is the only kind that is simple physically. Physically a wave train in a dispersing medium is a very complicated phenomenon.

VARIATION OF WEIGHT WITH CHEMICAL AND PHYSICAL CHANGES.

The electromagnetic theory of inertia, in which the inertia of matter is attributed to corpuscular electric charges in the structure of atoms, leads one to expect a decrease in the total inertia of two substances like H and O when they combine to form water for the following reasons. A moving electric charge has inertia. The amount of this inertia is determined by the extent to which the electric lines of force from the charge permeate surrounding space, for this determines the extent of the magnetic field which is produced by the movement of the charge. Most of the inertia effect is, however, in the region near the charge, for there the electric field and also its magnetic effect are greatest. Two adjacent opposite charges side by side have less electrical inertia than the same two charges widely separated, for the reason that the electric lines of force permeate less into remote regions of space.

If inertia and gravitation vary together we should thus expect a given amount of O and H to weigh less when these substances are combined to form water.

Very careful attempts have been made to detect changes in weight due to chemical changes by Landolt in 1893 and by Heydweiller in 1900, and the changes are so small as to be questionable. Attention was called in 'Physics Notes' several years ago in SCIENCE to the fact that a variation of weight (or mass) with chemical changes would by no means necessarily vitiate the principle of the conservation of matter, so that such changes, if they exist, are of most importance in their bearing upon the perplexing questions of gravity and inertia.

Recently it is announced that Professor Babcock has established the fact of the variation of weight with chemical and physical changes. He is reported to have used a special form of hydrostatic balance capable of detecting a change in weight of one part in a hundred million. This degree of refinement is in fact about that which can be reached by the ordinary balance, and when we remember that the temperature of his water-bath would, unless compensating devices are devised and used, have to be controlled to about 1/40,000 of a centigrade degree to enable him to avail himself unmistakably of a sensitiveness of one part in a hundred million, it seems doubtful that he could have realized a sensitiveness anything like as great as that at the disposal of Landolt in 1893, at the disposal of Heydweiller in 1900 and also at any one's disposal now in 1903. When the buoyant force of the air, only, is involved temperature must be controlled to about 1/400 of a centigrade degree to enable one to detect unmistakably so small a variation in weight as one part in a hundred million. W. S. F.

RESOLUTIONS OF THE NATIONAL EDUCATIONAL ASSOCIATION.

THE committee on resolutions at the Boston meeting of the National Educational Association, which consisted of Nicholas Murray Butler, of New York, Chairman; Andrew S. Draper, of Illinois; James M. Green, of New Jersey; Bettie A. Dutton, of Ohio; H. B. Frissell, of Virginia; prepared the following declaration, which was adopted by the association.

1. The United States Bureau of Education has amply proved its usefulness to the nation. Its publications are standard works of reference for school officers and teachers everywhere. The Bureau of Education should be made an independent administrative department, such as were the Departments of Agriculture and of Labor before their elevation to Cabinet rank. Sufficient appropriations should be made by the Congress to enable the Commissioner of Education to extend the scope and add to the usefulness of his work.

2. The condition of affairs in the Indian Territory, where fully three quarters of the population are reported as being without schools for their children, demands the immediate attention of the Congress. Provision should be speedily made by which the people of the Indian Territory will have power to establish and carry on a system of public schools so that all classes of citizens in the Indian Territory may have the educational opportunities which are enjoyed by their fellow-citizens in other parts of the country.

3. Teaching in the public schools will not be a suitably attractive and permanent career, nor will it command as much of the ability of the country as it should, until the teachers are properly compensated and are assured of an undisturbed tenure during efficiency and good behavior. A large part of the teacher's reward must always be the pleasure in the character and quality of the work done; but the money compensation of the teacher should be sufficient to maintain an appropriate standard of living. Legislative measures to give support to these principles deserve the approval of the press and the people.

4. The true source of the strength of any system of public education lies in the regard of the people whom it immediately serves, and in their willingness to make sacrifices for it. For this reason a large share of the cost of maintaining public schools should be borne by a local tax levied by the county or by the town in which the schools are. State aid is to be regarded as supplementary to, and not as a substitute for, local taxation for school purposes. In many parts of the United States a large increase in the amount of the local tax now voted for school purposes, or the levying of such a tax where none now exists, is a pressing need if there are to be better schools and better teachers.

5. The highest ethical standards of conduct and of speech should be insisted upon among teachers. It is not becoming that commercialism or self-seeking should shape their actions, or that intemperance should mark their utterances. A code of professional conduct clearly understood and rigorously enforced by public opinion is being slowly developed, and will, doubtless, one day control all teachers worthy of the name.

6. It is important that school buildings and school grounds should be planned and decorated so as to serve as effective agencies for educating not only the children but the people as a whole in matters of taste. The school is becoming more and more a community center, and its larger opportunities impose new obligations. School buildings should be attractive as well as healthful, and the adjoining grounds should be laid out and planned with appropriateness and beauty.

7. Disregard for law and for its established modes of precedure is as serious a danger as can menace a democracy. The restraint of passion by respect for law is a distinguishing mark of civilized beings. To throw off that restraint, whether by appeals to brutal instincts or by specious pleas for a law of nature which is superior to the laws of man, is to revert to barbarism. It is the duty of the schools so to lay the foundations of character in the young that they will grow up with a reverence for the majesty of the law. Any system of school discipline which disregards this obligation is harmful to the child and dangerous to the state. A democracy which would endure must be as law-abiding as it is liberty-loving.

THE AMERICAN ELECTROCHEMICAL SOCIETY.

The fourth general meeting of the American Electrochemical Society will be held at Niagara Falls, N. Y., September 17, 18 and 19, 1903. Thursday and Friday afternoons will be devoted to visits to power houses and